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ABSTRACT

The relationship between teacher clarity (as reflected by both low-inference and high-inference measures and the student outcome measures of achievement and satisfaction were examined. Data on 32 preservice teachers, each of whom taught the same lesson to a small group of their peers, were provided by trained observers using the Teacher Clarity Observation Instrument; by the teachers completing a Teacher Post-Instruction Questionnaire; and by participating students completing a short unit posttest and a corresponding student Post-Instruction Questionnaire. The data were subjected to a variety of canonical variate and regression analyses, as well as path analysis techniques. It was shown that there is a positive, highly significant, and substantial relationship between clear teaching behavior and student achievement and satisfaction when assessed within the context of a peer teaching laboratory situation. (Author/PN)

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Measures of Teacher Clarity and their Relationships to Student Achievement and Satisfaction

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Abstract

Measures of Teacher Clarity and their Relationships to Student Achievement and Satisfaction

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The purpose was to examine relations between the clarity behaviors of teachers (as reflected by both low-inference and high-inference measures) and the student outcome measures of achievement and satisfaction. Data on 32 teachers, each of whom taught the same lesson within a small-group setting, were provided by trained observers, the teachers, and participating students, and were subjected to a variety of multivariate analyses. Measures of teacher clarity correlated highly and were shown to have a significant and positive relationship to both student achievement and student satisfaction.

Measures of Teacher Clarity and their Relationships to Student Achievement and Satisfaction

The high-inference behavior, teacher clarity, was identified as the most promising teacher-effects variable by Rosenshine and Furst (1971) in their review of fifty process-product research studies. Additional support for the clarity variable has been recently offered (Good & Grouws, 1977; Land & Smith, 1979). But, as has been pointed out by Heath and Nielson (1974), much of the earlier research that suggested that teacher clarity is positively related to student achievement employed ambiguous, imprecise, and even circular operational definitions of the high-inference clarity variable. Such aforementioned shortcomings have cast doubt on the integrity of findings supporting the clarity construct.

Researchers have suggested that many of the problems associated with research into teacher clarity could be overcome by defining clarity in terms of lower-inference behaviors, behaviors that are directly observable and measurable (Kennedy & Bush, 1976). Subsequently, such research on clarity has been conducted using junior high school students (Bush, Kennedy, & Cruickshank, 1977; Kennedy, Cruickshank, Bush, & Myers, 1978). That research demonstrated that teacher clarity is a meaningful construct that can be reliably defined in terms of specific lower-inference behaviors, and further, that these lower-inference behaviors discriminate extremely well between clear and unclear teachers in a variety of geographical locations.

Further research into the operatinal definition of teacher clarity conducted at the college level(Hines, 1981), but not reported here, has produced a pattern of clear teaching behaviors highly consistent with findings given in the junior high school studies. The cumulative results of these studies have provided a set of specific lower-inference behaviors which serve to operationally define the high-inference clarity variable across at least two educational levels, junior high school and college. In addition, Hines found a strong and significant correlation between high-inference measures of clarity and measures of the lower-inference behaviors identified (R ranged from 0.95 to 0.99, $p < .001$), thus investing credibility in the construct validity of the operational constituents of clarity and the ability of these lower-inference behaviors to measure the clarity variable.

The purpose of this investigation was to extend research into teacher clarity. Specifically, the research to be reported was conducted to assess relations between observed and perceived measures of teacher clarity and the outcome measures of student achievement and satisfaction.

Method

Participants and Procedures

Each of 32 preservice teachers enrolled in education courses at The Ohio State University during the Spring and Summer Quarters, 1980 taught a specially prepared unit of instruction[1] with

[1]This instructional unit was adapted from a Reflective Teaching Lesson "The Matrix Multiplication Task" (Cruickshank, et al., 1981).

specified lesson objectives, to a small group of peers within the context of a relatively new laboratory teaching experience, Reflective Teaching (Cruickshank, Holton, Fay, Williams, Kennedy, Myers, & Hough, 1981). Random procedures were used to assign both teachers and student peers to groups. Teaching episodes typically lasted 25 minutes and each lesson was videotaped. On completion of the lesson, students were administered a short unit posttest and a Student Post-Instruction Questionnaire. Teachers completed a corresponding Teacher Post-Instruction Questionnaire.

Students and their teacher provided on their respective questionnaires, selected ratings (measures) of the teacher's performance on low- and high-inference clarity behaviors, as well as ratings of their degree of satisfaction with the lesson. In addition, working with videotaped lessons, two trained observers provided measures of teacher performance on low-, intermediate-, and high-inference clarity behaviors using an observational instrument (the Teacher Clarity Observation Instrument) prepared and field-tested within the context of this study.

Instrumentation[2]

The Teacher Clarity Observation Instrument was used by two trained observers to abstract from videotaped lessons, ratings of high-, intermediate-, and lower-inference clarity behaviors, as well as tabulations of the frequency of occurrence of the low-inference clarity behaviors. It contained 29 clarity behavioral

[2]The lower-inference clarity behaviors incorporated in each of the instruments described were previously identified as operational constituents of teacher clarity and were found to be "prime" discriminators between clear and unclear teachers as perceived by a sample of college students (Hines, 1981). All instruments were developed and field-tested within the context of this study.

statements based on prior research of the clarity construct (Bush, 1976; Kennedy, Cruickshank, et at., 1978; Hines, 1981), and was organized into two sections.

Section I contained 18 low-inference teacher clarity behavioral statements grouped into four subsets. Each subset reflects an underlying intermediate dimension of the clarity construct in keeping with the underlying factors which define the construct (Hines, 1981). The four intermediate behavioral dimensions and their respective low-inference clarity behavioral statements were as follows:

Stresses (emphasizes) important aspects of content. The teacher points out what is important for students to learn, repeats things (rules, terms, definitions, concepts) that are important, writes important things (rules, terms, etc.) on the board/chart; summarizes the material presented in the lesson.

Explains instructional content. The teacher explains specific aspects of content, uses written, verbal or practical examples when explaining.

Provides for student assimilation and synthesis of instructional content. The teacher explains what unfamiliar (or new) words mean; explains something and then stops so that students can think about it; shows similarities and differences between things; shows students how to remember things; reviews what has already been studied (or taught).

Assesses and tries to ensure student understanding of instructional content. The teacher tries to find out if students understand instructional content (e.g., asks questions to find out if

students understand, examines students work individually, has students work publicly); allows time (pauses) for students to ask questions; repeats things when students do not understand; answers students' questions; provides time for students to practice.

The 18 low-inference clarity behavioral statements distributed among the previously cited intermediate dimensions in Section I were recorded in terms of their frequency of occurrence during the lesson.

Section II contained 11 clarity behavioral statements. But unlike the prior section, each behavioral statement was rated (as opposed to counted) on a Likert-type scale with five response categories appropriate to the given item. One item was a global (high-inference) measure of the clarity variable, four items were measures of the intermediate-inference clarity dimensions formulated in Section I. The remaining six items (also associated with one of the four subsets in Section I) were lower-inference behavioral statements which were considered to reflect a qualitative dimension of the clarity construct and thus were more appropriately measured in terms of scale ratings (answers students' questions adequately; uses relevant examples when explaining; teaches step-by-step; provides students with sufficient examples of how to do the work; presents the lesson in a logical manner; adequately informs students of the lesson objectives and what they are expected to be able to do on completion of the lesson/course).

The reliability of observer measures were estimated with

resulting generalizability coefficients, reflecting consistency over observers, behaviors, and teachers, ranging from 0.75 for low-inference frequency of occurrence behaviors to 0.97 for observer ratings (Medley & Mitzel, 1963).

The Student Post-Instruction Questionnaire was designed to obtain students' perceptions of the occurrence of specific teacher clarity behaviors and their degree of satisfaction with the learning situation. It included 13 lower-inference clarity behavioral statements and one global (high-inference) measure of teacher clarity (12 of these clarity measures were included in the Teacher Clarity Observation Instrument described above). In addition, four lower-inference and one global (high-inference) measure constituted the student satisfaction variable subscale. Internal consistency reliability estimates for the Clarity and Student Satisfaction subscales (as given by Cronbach's Coefficient Alpha) were 0.91 and 0.88, respectively.

The Teacher Post-Instruction Questionnaire obtained teacher's self-ratings of their teaching performance and degree of satisfaction with the instructional situation in which they were engaged. The instrument was identical in format and similar in item content to the Student Post-Instruction Questionnaire. Internal consistency reliability estimates for the Clarity and Satisfaction subscales (as given by Cronbach's Alpha) were 0.87 and 0.82, respectively.

The Unit Posttest, a four-item achievement test, was designed to measure immediate student learning. Each item had multiple parts and was directly related to one of the specified

lesson objectives. Maximum test score was 24 points. Internal consistency test reliability estimate (as given by Cronbach's Alpha) was 0.60.

Data Analysis

The individual teacher was used as the unit of analysis. Observers' and students' (class) mean scores/ratings were used as measures of the variables of interest. To determine the relationships between clarity and the criterion measures of student achievement and satisfaction, seven separate data sets differing with respect to the level of clarity (low-inference vs. intermediate-inference vs. high-inference), and source of measurement (observers vs. students vs. teachers) were subjected to a variety of canonical variate and regression analyses. Path analysis techniques were also employed to further explore the nature of these relationships.

Results

Interpretation of initial canonical variate analysis followed by selective multiple regression analyses revealed that teacher clarity was found to bear a highly significant and positive relationship to both student achievement and satisfaction across all measured levels (low-, intermediate-, and high-inference) of the clarity variable and across all three sources of measurement (trained observers, students, and teachers). A summary of these analyses is given in Table 1.

Insert Table 1 about here

Although statistical significance at the requisite level ($p < .05$) was not achieved for the principal canonical variate which related observer measures of low-inference clarity to the two student outcome measures, the amount of variation in the criterion variable set (redundancy) accounted for by the clarity behavior set seemed nonetheless substantial (41 percent) and warranted additional investigation. Further exploration of the strength of the relationship between this clarity measure and each respective criterion measure, using post hoc stepwise multiple regression analyses, yielded a substantial and highly significant relationship between clarity and student achievement ($R = 0.72$, $p < .03$). In sum, observer low-inference clarity measures are strongly linked to student achievement, but less so to student satisfaction.

Comparison of the data reported in Table 1 across all three measurement sources, show that observers' measures of teacher clarity bore the strongest relationship to student achievement, accounting for approximately 40 to 52 percent of the variance in this criterion measure. Students' measures of teacher clarity (high and low-inference) bore the strongest relationship to student satisfaction, accounting for 48 and 84 percent respectively, of the variance in this criterion measure. Teachers' self-ratings of their own performance on the clarity variable was generally found to bear the weakest relationship to the criterion measures. In sum, both the high and low-inference measures of participating teachers' self-assessment of clarity correlated less well with the student outcome measures of

achievement and satisfaction.

In an attempt to synthesize the complex of relations between clarity and student achievement and satisfaction, two path analyses were performed. The path analysis model employed assumes a weak causal ordering of the variables in the sequence shown in Figure 1.[3]

Insert Figure 1 about here

The high-inference measures of teacher clarity used in these analyses were provided by the two trained observers. (There was a high level of agreement and consistency between observers in their ratings of teachers on this variable--Cronbach's Alpha was 0.99). Table 2 presents the intercorrelations of the variables contained in the composite model depicted in Figure 1, a model which attempts to articulate the results of the two path analyses. Table 3 reports the relevant path coefficients for these analyses.

Insert Table 2 and Table 3 about here

Examination of the aforementioned Figure and Table 3, showed that students' percepiton of teacher clarity was found to

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[3]The figure depicts a composite of the two separate path analyses. One analysis contained the variables (i) teacher clarity, (ii) student perception of clarity, and (iii) student achievement. The other contained the variables (i) teacher clarity, (ii) student perception of clarity, and (iii) student satisfaction.

strongly mediate the effect of clarity on student satisfaction (path coefficient=0.51, $p < .001$), and to moderately mediate the effect of clarity on achievement (path coefficient = 0.13). On the other hand, the direct effect of clarity on achievement was very substantial and highly significant (path coefficient = 0.51, $p < .01$). Thus, the relationship between teacher clarity and student satisfaction was essentially explained through students' perception of clarity. The relationship between clarity and achievement related, for the most part, to the specific teacher behaviors actually exhibited by the teacher during instruction. These results suggest, (a) that students who perceived their teacher to be clear were more likely to feel a higher degree of satisfaction with their learning experience than their peers who perceived the teacher to be less clear; (b) if a teacher exhibited a high level of clear teaching behavior, it was possible for students to achieve, although their perception of the level of clarity behavior exhibited by the teacher may not be congruent with that which was actually exhibited. Nonetheless, students who perceived their teacher to be clear were more likely to outperform their peers who perceived the teacher to be less clear.

Discussion

This investigation has shown that there is a positive, highly significant, and more importantly, a substantial relationship between clear teaching behavior and student achievement and satisfaction, when assessed within the context of a peer teaching

laboratory situation. The pattern of this relationship was observed to be consistent across a triangulation of measurement sources--observers, students, and teachers--and three different levels of measure of the clarity variable (lower-inference, intermediate-inference, and high-inference). Further, as anticipated by Kennedy, Cruickshank et al. (1978), the use of students' perceptions of teacher clarity as a mediating process variable helped to illuminate the nature of the relationship between clarity and the criterion measures.

The findings of this study are most encouraging. Aside from the documented relations between teacher clarity and student outcome measures, evidence also indicates that the low-inference constituents of teacher clarity used in this research can be observed and reliably measured in a teaching situation. They also appear to provide a valid measure of high-inference ratings of teacher clarity, ratings that can also be used as proxy for the lower-inference measures used in this study (at least for research purposes). Most significant, however, is that the specific behaviors of teachers do in fact appear to make a difference.

Although too early to advance definitive recommendations to teacher educators, it does appear that the lower-inference behaviors identified as constituents of teacher clarity provide teacher trainers with specific teacher behaviors which could be used in the training of preservice teachers. Knowledge of, and skill in the use of these behaviors should help preservice teachers become more clear.

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TABLE 1

SUMMARY RESULTS OF THE RELATIONSHIP BETWEEN THE TEACHER CLARITY VARIABLE AND STUDENT ACHIEVEMENT AND SATISFACTION BY LEVEL OF MEASURE OF CLARITY AND MEASUREMENT SOURCE

		Canonical Analysis			Stepwise Regression Analysis			
					Student Achievement		Student Satisfaction	
Level of Measure of Clarity Variable	Measurement Source	Canonical-R: Principal Canonical Variate	Redundancy of Criterion Variable Set for First Canonical Variate	Total Redundancy of Criterion Variable Set	R	R^2	R	R^2
Low-Inference [a]	Observers	0.73	0.41	0.44	0.72*	0.52	0.60	0.36
	Students	0.95**	0.64	0.70	0.69*	0.47	0.92**	0.84
	Teachers	0.67*	0.32	0.36	0.53	0.28	0.67**	0.44
Intermediate-Inference	Observers	0.70**	0.36	0.40	0.67**	0.45	0.58*	0.34
					r	r^2 Pearson r	r	r^2
	Observers	0.65**	0.30	0.30	0.63**	0.40	0.46**	0.21
High-Inference	Students	0.73**	0.38	0.38	0.53**	0.28	0.69**	0.48
	Teachers	0.45*	0.15	0.15	0.34*	0.12	0.43*	0.18

*$p < .05$

**$p < .01$

[a] Since the sample size to number of variables ratio was relatively small for this variable set, it was considered prudent to reduce the number of variables in the low-inference clarity behavior set to guard against the possible trivial contributions of a large number of independent variables to the inflation of the Canonical R and redundancy measures. Behaviors which appeared to be making the strongest contributions to the canonical variates were identified. These were the variables which showed structure coefficients of 0.50 or greater on the canonical variates. In each data set 9 such lower-inference behaviors were identified and incorporated in a reduced lower-inference clarity behavior set for these analyses.

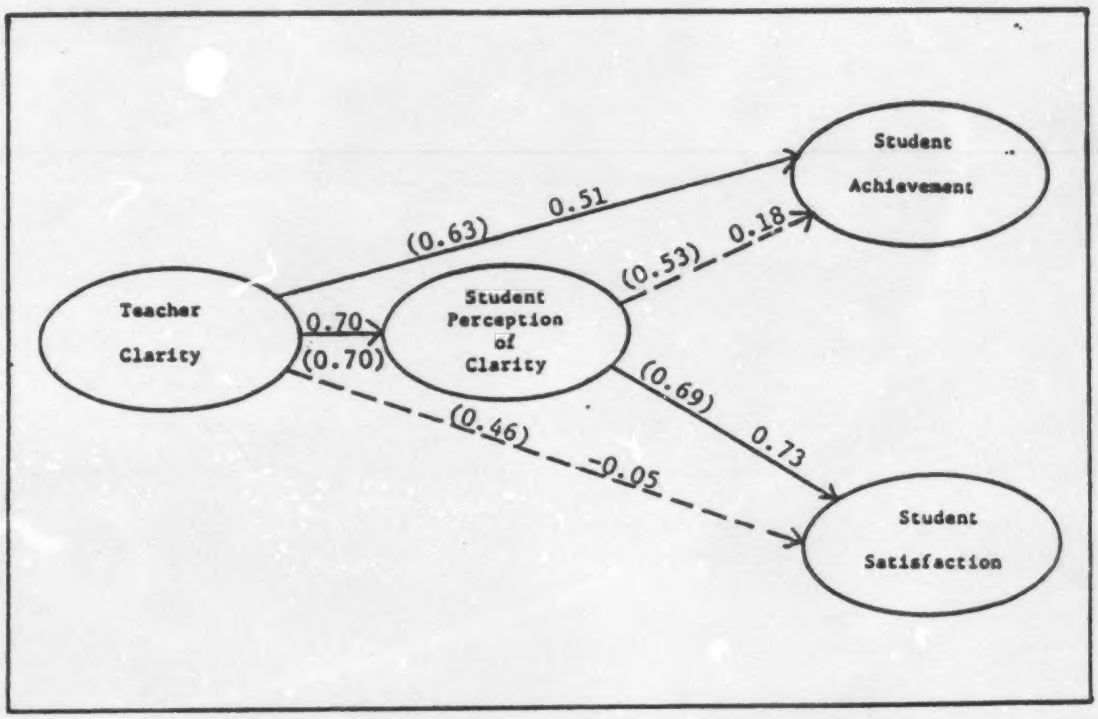

Figure 1. Path Diagram of Teacher Clarity Behavior

Note: Numbers in parentheses are zero-order correlations. The other numbers are path coefficients.

TABLE 2

ZERO-ORDER INTERCORRELATIONS OF VARIABLES
IN PATH ANALYSIS MODEL
(N = 32)

Variables	Variables (2)	(3)	(4)
1. Teacher Clarity	0.70	0.63	0.46
2. Student-Perceived Clarity		0.53	0.69
3. Student Achievement			0.50
4. Student Satisfaction			1.00

TABLE 3

DECOMPOSITION OF THE ZERO-ORDER CORRELATIONS
IN PATH ANALYSIS MODEL

Pairs of Variables		Direct Causal Effects	Indirect Causal Effects	Total Effects	r_{xy}
Teacher Clarity	Student-Perceived Clarity	0.70**	none	0.70	0.70
Teacher Clarity	Student Achievement	0.51*	0.13	0.64	0.63
Teacher Clarity	Student Satisfaction	-0.05	0.51**	0.46	0.46

*$p < .01$, **$p < .001$